



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/851,905	05/09/2001	Thomas Sonderman	2000.044700	3951
23720	7590	03/02/2004	EXAMINER	
WILLIAMS, MORGAN & AMERSON, P.C. 10333 RICHMOND, SUITE 1100 HOUSTON, TX 77042			JARRETT, RYAN A	
			ART UNIT	PAPER NUMBER
			2125	

DATE MAILED: 03/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/851,905

Applicant(s)

SONDERMAN ET AL.

Examiner

Ryan A. Jarrett

Art Unit

2125

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/26/04.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-11,13-21,23-41 and 43-61 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-11,13-21,23-41 and 43-61 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The amendment to independent claims 1, 11, 21, 31, 41, and 51 does not change the scope of the claims. New claim 61 recites modeling the dependence of the deposition rate on both the deposition power **and** the deposition time. This subject matter was already contained in the dependent claims and was previously rejected. Additionally, the Examiner has already addressed the arguments made by the Applicant in the response filed 1/26/04. Accordingly, this rejection is made final.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 5, 6, 9-11, 15, 16, 19-21, 25, 26, 29-32, 35, 36, 39-41, 45, 46, 49-52, 55, 56, 59, and 60 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Turner U.S. Patent No. 4,166,783. Turner discloses a method, program storage device, computer, and system comprising: monitoring consumption of a sputter target to determine a deposition rate (using deposition rate sensors) of a metal layer during metal deposition processing using the sputter target (col. 1 lines 34-37, col. 3 line 64 – col. 4 line 7); modeling a dependence of the deposition rate on the deposition plasma power (col. 3 lines 23-32); and applying the deposition rate model to modify the metal

Art Unit: 2125

deposition processing to form the metal layer to have or approach a desired thickness (col. 3 lines 12-16, col. 3 lines 32-36);

wherein monitoring the consumption of the sputter target to determine the deposition rate of the metal layer during the metal deposition processing comprises modeling a dependence of the deposition rate on a target life of the sputter target (col. 3 lines 23-32);

wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the deposition plasma power to form the metal layer to have the desired thickness (col. 3 lines 32-36);

wherein modeling the dependence of the deposition rate on the deposition plasma power (implied) and target life (Fig. 1) of the sputter target comprises fitting previously collected metal deposition processing data using at least one of polynomial curve fitting, polynomial least-squares fitting, non-polynomial least-squares fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting (Fig. 1 illustrates the modeling of the dependence of deposition rate on sputter target life using least-squares fitting – it is implied that the dependence of deposition rate on deposition plasma power is modeled in a similar fashion);

wherein modeling the dependence of the deposition rate on the target life of the sputter target comprises modeling the dependence of the deposition rate on target lives of a plurality of previously processed sputter targets (col. 2 lines 10-13).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 4, 7, 8, 13, 14, 17, 18, 23, 24, 27, 28, 33, 34, 37, 38, 43, 44, 47, 48, 53, 54, 57, 58, and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner in view of Sullivan et al. U.S. Patent No. 6,217,720. Turner does not specifically disclose "modeling a dependence of the deposition rate on the deposition time or inverting the deposition rate model to determine the deposition time to form the metal layer having a desired thickness." However, Sullivan et al. discloses a multi-layer reactive sputtering method comprising modeling the dependence of a deposition rate on a deposition time and determining the time required to form a metal layer having the desired thickness (e.g. Fig. 5, col. 7 line 50 – col. 8 line 10, col. 8 line 60 – col. 9 line 15). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Sullivan et al. with the system of Turner since Sullivan et al. teaches that modeling a dependence of a sputtering deposition rate on the deposition time can assist in optimizing a desired layer thickness using a relatively high deposition rate and short deposition time.

6. Claims 9, 10, 19, 20, 29, 30, 39, 40, 49, 50, 59, and 60 are *additionally* rejected under 35 U.S.C. 103(a) as being unpatentable over **Turner** as applied to claims 1, 2, 11, 12, 21, 22, 31, 32, 41, 42, 51, and 52 above. **Turner** does disclose modeling the

Art Unit: 2125

dependence of deposition rate on deposition power as noted above. However, **Turner** does not explicitly disclose that the dependence of deposition rate on deposition power is modeled using the curve-fitting techniques of the claimed invention.

However, **Turner** does disclose in Fig. 1 modeling the dependence of deposition rate on sputter target life using curve-fitting techniques. Additionally, it is well known in the art to use the various curve-fitting techniques of the claimed invention to model historical data. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify **Turner** to include the capability to model the dependence of deposition rate on deposition power using the various curve-fitting techniques since **Turner** already discloses curve-fitting as a means to **accurately** model the dependence of deposition rate on target life, and also since the multiple curve-fitting techniques of the claimed invention are well-known in the art.

Conclusion

7. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

Art Unit: 2125

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan A. Jarrett whose telephone number is (703) 308-4739. The examiner can normally be reached on 10:00-6:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached on (703) 308-0538. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ryan A. Jarrett
Examiner
Art Unit 2125

3/1/04

LEO PICARD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100